

APPENDIX E

MTCA Cleanup Criteria Calculations

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

<u> </u>	Symbol	Value	Units
1. General information			
Name of Chemical:		Acenaphthyl	ene
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF , ABS_d , GI :			_iթ.,⊬բ
2. Toxicological Properties of the Chemical: Chemical-Specific	V		
Oral Reference Dose:	RfD_{o}	6.00E-02	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF a		kg-day/mg
Inhalation Reference Dose:	RfD_i		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF _i		kg-day/mg
3. Exposure Parameters	• '		_ • • •
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH	1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS i	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm ² -day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific	(
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K _{oc}	4.900E+03	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	$H_{cc} \blacktriangle$	6.400E-03	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m3/mol", enter value here:	H		atm.m³/mol
*Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	\overline{H}_{cc}	0.000E+00	unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	4.200E+00	mg/l
5. Target Ground Water Cleanup Level	•		
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:	<i>C</i>	0.0051.03	11
*Results from the Ground Water Cleanup Level Worksheet are	C _W	9.90E+02	ug/l
not automatically transferred into this worksheet.	i		1
6. Site-Specific Hydrogeological Characteristics	•	·	- 1
Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	$oldsymbol{arTheta}_{\scriptscriptstyle NP}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	Θ_{α}	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms			
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)	ı		-
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern:

Acenaphthylene

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units		
Most stringent soil concentration based on Soil Direct				
Contact & Ground Water Protection:	2.523E+02	mg/kg		
Natural Background concentration for Soil:	N/A	mg/kg		
Practical Quantitation Limit for Soil:	N/A	mg/kg		
Soil Cleanup Level (not considering vapor pathway):	2.523E+02	mg/kg		
Warning! Soil Cleanup Level above may not be protective of vapor exposur pathway - evaluate vapor pathway further.				
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg		

Warning: Soil Cleanup Level is higher than Soil Saturation

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Limit!

C _{sat} corresponds to the total soil chemical concentration saturated in soil.

R is the ratio of the ground water flow velocity to the

Soil Saturation Limit, C_{sat} :	5.353E+01	mg/kg
Retardation Factor, R:	44.8	unitless

R is the ratio of the ground water flow velocity to the contaminant migration velocity in saturated zone.

	Summary by Exposure Pathway						
		j zj zaposare ruca	<u>Meth</u> Unrestricte	o <u>d B</u> d Land Use RISK =1.0E-6	Method C Industrial Land Use @ HQ=1.0; RISK =1.0E-5		
Soil Direct			Ingestion only	Ingestion &	Ingestion only	Ingestion &	
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A	
	Target Soil CUL? mg/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	4.800E+03 N/A	N/A N/A	2.100E+05 N/A	N/A N/A	
		[@:doi: 1.05 0 01 1.05-3	<u>Meth</u> @ HQ=1.0; R	od B	<u>Meth</u> @ HQ=1.0; R	od C	
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	N/A				
Potable	Condition	HQ? @ Exposure Point	N/A		N/A		
Ground Water	Target Ground Wate	RISK? @ Exposure Point	N.	/A 9.900	F+02	/A	
		mg/kg	 	2.523			
			Method B Method C @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RISK =1.0E			•	
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point	N/A				
Air Quality	Condition	HQ? @ Exposure Point	N/A		N		
(for informational	Target Air	RISK? @ Exposure Point @ HQ=1.0	N/A N/A		N.		
purpose only)	CUL? ug/m ³	@ RISK=1.0E-6 or 1.0E-5	N/A		N/A N/A		
	Target Soil	@ HQ=1.0	N/A		N/A		
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A	

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- · Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).

Date:

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Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:		Anthracene	
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF , ABS_d , GI :	~ · [
2. Toxicological Properties of the Chemical: Chemical-Specific	۷		
Oral Reference Dose:	RfD_a	3.00E-01	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF o		kg-day/mg
Inhalation Reference Dose:	RfD_{i}		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF,		kg-day/mg
3. Exposure Parameters		· · · · · · · · · · · · · · · · · · ·	
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH [1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS;	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm ² -day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI "		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific	-		
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K _{oc}	2.300E+04	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H_{cc}	2.700E-03	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m ³ /mol", enter value here: *Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H H _{cc}	0.000E+00	atm.m³/mol unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	4.300E-02	mg/l
5. Target Ground Water Cleanup Level		•	_
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:			
*Results from the Ground Water Cleanup Level Worksheet are	$C_{ u}$	4.00E+04	ug/l
not automatically transferred into this worksheet.	l		_
6. Site-Specific Hydrogeological Characteristics	•		
Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	$\boldsymbol{\varTheta}_{\boldsymbol{\mathfrak{w}}}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	Θ_{α}	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	$\rho_{\it b}$	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms	•		_
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)			_
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern:

Anthracene

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here: **V**

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units	
Most stringent soil concentration based on Soil Direct			Wa
Contact & Ground Water Protection:	4.726E+04	mg/kg	Lim
Natural Background concentration for Soil:	N/A	mg/kg	
Practical Quantitation Limit for Soil:	N/A	mg/kg	
Soil Cleanup Level (not considering vapor pathway):	4.726E+04	mg/kg	
Warning! Soil Cleanup Level above may not be pr pathway - evaluate vapor pathwa	-	or exposure	
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg	C.
			'R

Warning: Soil Cleanup Level is higher than Soil Saturation

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C_{sat} corresponds to the total soil chemical concentration saturated in soil.

R is the ratio of the ground water flow velocity to the

Soil Saturation Limit, C _{sat} :	2.540E+00	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	206.4	unitless	contaminant migration velocity in saturated zone.

	Summary by Exposure Pathway						
		V	<u>Meth</u> Unrestricte	od <u>B</u> d Land Use RISK =1.0E-6	<u>Method C</u> Industrial Land Use @ HQ=1.0; RISK =1.0E-5		
Soil Direct		•	Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal	
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A	
	Target Soil CUL? mg/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	2.400E+04 N/A	N/A N/A	1.050E+06	N/A	
	·	T@1017 - 1.00-0 01 1.00-3	Meth @ HQ=1.0; RI	od B	N/A <u>Meth</u> @ HQ=1.0; R	•	
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	N/A				
Potable Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A		N/A N/A		
Ground Water	Target Ground Wate	er CUL? ug/l		4.000	E+04	/A	
	Target Soil CUL?	mg/kg		4.726	E+04		
			<u>Method B</u> <u>Method C</u> @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RISK =1				
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point	N/A			,	
Air Quality	Condition	HQ? @ Exposure Point	N/A		N	/A	
(for informational		RISK? @ Exposure Point	N/A		N	/A	
purpose only)	Target Air	@ HQ=1.0	N/A 5 N/A		N	/A	
	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5			N	/A	
	Target Soil	@ HQ=1.0	N/A		N/A		
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A	

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:	[]	Benzo(a)antl	hracene
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s	· · · · · · · · · · · · · · · · · · ·	mg/kg
Practical Quantitation Limit for Soil:	PQL's		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF, ABS d, GI:			
2. Toxicological Properties of the Chemical: Chemical-Specific	٧		
Oral Reference Dose:	RfD_{σ}	•	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF _a	7.30E+00	kg-day/mg
Inhalation Reference Dose:	RfD_i		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF _i		kg-day/mg
3. Exposure Parameters			
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH [1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS;	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm ² -day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI T		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific			
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K_{oc}	3.600E+05	1/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H_{cc}	1.400E-04	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m3/mol", enter value here:	H		atım.m³/mol
*Converted unitless form of H_{cc} @13°C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H_{cc}	0.000E+00	unitless

9.400E-03 Solubility of the Chemical in Water: for the calculation of soil saturation limit S mg/l 5. Target Ground Water Cleanup Level Target Ground Water Cleanup Level applicable for a soil cleanup level calculation: C_{w} 1.80E-02 *Results from the Ground Water Cleanup Level Worksheet are ug/l not automatically transferred into this worksheet. 6. Site-Specific Hydrogeological Characteristics Total Soil Porosity (default = "0.43"): 0.43 lunitless 11 Volumetric Water Content (default = "0.30"): Θ,,, unitless 0.3 Volumetric Air Content (default = "0.13"): Θ_{α} 0.13 unitless Dry Soil Bulk Density (default = "1.50"): ρ_b 1.5 kg/l Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{ac} value here 0.00256 f_{oc} lunitless Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific) DF 20 unitless 7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms * Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the air concentration at the exposure point (e.g., within the building) Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway VAF unitless

B. SUMMARY OF SOIL CLEANUP LEVEL CALCULATIONS

Chemical of Concern:

Benzo(a)anthracene

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units
Most stringent soil concentration based on Soil Direct		
Contact & Ground Water Protection:	3.318E-01	mg/kg
Natural Background concentration for Soil:	N/A	mg/kg
Practical Quantitation Limit for Soil:	N/A	mg/kg
Soil Cleanup Level (not considering vapor pathway):	3.318E-01	mg/kg
Warning! Soil Cleanup Level above may not be pr pathway - evaluate vapor pathwa	_	or exposure
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg

 ${\it C}_{\it sat}$ corresponds to the total soil chemical concentration saturated in soil.

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R is the ratio of the ground water flow velocity to the

V

Soil Saturation Limit, C_{sat} :	8.665E+00	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	3,215.9	unitless	contaminant migration velocity in saturated zone.

T Care	Summary of Calculation for each Exposure Pathway								
Summary by Exposure Pathway									
			Unrestricte	Method B Unrestricted Land Use @ HQ=1.0; RISK =1.0E-6		<u>od C</u> Land Use ISK =1.0E-5			
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal			
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A			
	Target Soil CUL? mg/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	N/A 1.370E-01	N/A N/A	N/A 1.798E+01	N/A N/A			
			<u>Meth</u> @ HQ=1.0; RI	od B	<u>Meth</u> @ HQ=1.0; R	od C			
Protection of Potable	Under the Current	Predicted Ground Water Conc? ug/l		. N	I/A				
Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A		N/A N/A				
Ground Water	Target Ground Water	er CUL? ug/l	177	1.800	E-02	IVA			
	Target Soil CUL?	mg/kg		3.318	E-01				
			<u>Meth</u> @ HQ=1.0; RI		<u>Meth</u> @ HQ=1.0; R				
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point							
Air Quality	Condition	HQ? @ Exposure Point	N/A N/A			'A			
(for informational		RISK? @ Exposure Point	N/	/A	N/	'A			
purpose only)	Target Air	@ HQ=1.0	N/	/A	N/	'A			
	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5	N/	/A	N/	'A			
	Target Soil	@ HQ=1.0	N/	/A	N/	'A			
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A	N/	'A			

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- · Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).

Date:

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Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:		Benzo(b)flu	ranthene
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF, ABS d, GI:	Į.		
2. Toxicological Properties of the Chemical: Chemical-Specific			
Oral Reference Dose:	RfD_o		mg/kg-day
Oral Carcinogenic Potency Factor:	CPF _o	7.30E+00	kg-day/mg
Inhalation Reference Dose:	RfD_i		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF_i		kg-day/mg
3. Exposure Parameters	·		
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH	1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS_i	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm²-day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific			
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	$K_{\sigma c}$	1.200E+06	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H_{cc}	4.600E-03	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m 3 /mol", enter value here: *Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H H cc	0.000E+00	atm.m³/mol unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	1.500E-03	mg/l
5. Target Ground Water Cleanup Level			<u> </u>
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:	_	-	
*Results from the Ground Water Cleanup Level Worksheet are	C_{w}	1.80E-02	ug/l
not automatically transferred into this worksheet.			
6. Site-Specific Hydrogeological Characteristics			
Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	$\boldsymbol{\varTheta}_{\boldsymbol{\mathfrak{w}}}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	$\boldsymbol{\Theta}_{\boldsymbol{\alpha}}$	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b	1.5	kg/i
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for $f_{\sigma c}$ value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms	·	•	
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)	·		_
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern:

Benzo(b)fluoranthene

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units				
Most stringent soil concentration based on Soil Direct						
Contact & Ground Water Protection:	1.106E+00	mg/kg				
Natural Background concentration for Soil:	N/A	mg/kg				
Practical Quantitation Limit for Soil:	N/A	mg/kg				
Soil Cleanup Level (not considering vapor pathway):	1.106E+00	mg/kg				
Warning! Soil Cleanup Level above may not be protective of vapor exposure pathway - evaluate vapor pathway further.						
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg				

 $[\]mathbf{C}_{\mathit{sat}}$ corresponds to the total soil chemical concentration saturated in soil.

V

R is the ratio of the ground water flow velocity to the

Soil Saturation Limit, C _{sat} :	4.608E+00	mg/kg
Retardation Factor, R:	10,717.3	unitless

R is the ratio of the ground water flow velocity to the contaminant migration velocity in saturated zone.

Summary by Exposure Pathway							
			Method B Unrestricted Land Use @ HQ=1.0; RISK =1.0E-6		<u>Method C</u> Industrial Land Use @ HQ=1.0; RISK =1.0E-5		
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal	
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A	
	Target Soil CUL? mg/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	N/A 1.370E-01	N/A N/A	N/A 1.798E+01	N/A N/A	
			Method B Method C @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RISK =1				
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	N/A				
Potable Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point		/A /A	N/A N/A		
Ground Water	Target Ground Water	er CUL? :ug/l	1	1.800	E-02		
	Target Soil CUL?	mg/kg			E+00		
			<u>Meth</u> @ HQ=1.0; R		<u>Meth</u> @ HQ=1.0; R		
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point		N	/A	•	
Air Quality	Condition	HQ? @ Exposure Point	N/A N/A N/A			/A	
(for informational		RISK? @ Exposure Point				/A	
purpose only)	Target Air	@ HQ=1.0	Ņ/A		N	/A	
	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A	
	Target Soil	@ HQ=1.0	N	/A	N	/A	
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A	

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:		Benzo(k)fluo	ranthene
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF, ABS, GI:			
2. Toxicological Properties of the Chemical: Chemical-Specific			
Oral Reference Dose:	RfD o		mg/kg-day
Oral Carcinogenic Potency Factor:	CPF _o	7.30E+00	kg-day/mg
Inhalation Reference Dose:	RfD_i		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF_i		kg-day/mg
3. Exposure Parameters			
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH	1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS_{i}	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	l	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm²-day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific			_
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for $f_{\sigma c}$ value	K oc	1.200E+06	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	$H_{cc} \blacktriangle$	3.400E-05	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m 3 /mol", enter value here: *Converted unitless form of H_{cc} @13 $^{\circ}$ C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H H_{cc}	0.000E+00	atm.m³/mol unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	8.000E-04	mg/l
5. Target Ground Water Cleanup Level	!	·	_
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation: *Results from the Ground Water Cleanup Level Worksheet are not automatically transferred into this worksheet.	C 10	1.80E-02	ug/l
6. Site-Specific Hydrogeological Characteristics	•		
Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	$oldsymbol{arTheta}_{_{f 1p}}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	$\boldsymbol{\Theta}_{\boldsymbol{\alpha}}$	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_{b}	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms			_
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)			
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern: Benzo(k)fluoranthene

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units
Most stringent soil concentration based on Soil Direct		
Contact & Ground Water Protection:	1.106E+00	mg/kg
Natural Background concentration for Soil:	. N/A	mg/kg
Practical Quantitation Limit for Soil:	N/A	mg/kg
Soil Cleanup Level (not considering vapor pathway):	1.106E+00	mg/kg
Warning! Soil Cleanup Level above may not be properties pathway - evaluate vapor pathway		or exposure
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg

 $oldsymbol{C}_{\it sat}$ corresponds to the total soil chemical concentration saturated in soil.

R is the ratio of the ground water flow velocity to the

V

Soil Saturation Limit, C_{sat} :	2.458E+00	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	10,717.3	unitless	contaminant migration velocity in saturated zone.

Summary by Exposure Pathway								
			<u>Method B</u> Unrestricted Land Use @ HQ=1.0; RISK =1.0E-6		<u>Method C</u> Industrial Land Use @ HQ=1.0; RISK =1.0E-5			
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal		
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A		
	Target Soil CUL? ng/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	N/A 1.370E-01	N/A N/A	N/A 1.798E+01	N/A N/A		
	· · · · · · · · · · · · · · · · · · ·	1.0E-0 01 1.0E-0	<u>Meth</u> @ HQ=1.0; R	od B	1.798E+01 <u>Meth</u> @ HQ=1.0; R	od C		
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	N/A					
Potable Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A		N/A			
Ground water	Target Ground Wate		N	7A 1.800	N/A E-02			
	Target Soil CUL?	mg/kg		1.106	E+00			
			<u>Meth</u> @ HQ=1.0; RI		<u>Meth</u> @ HQ=1.0; R			
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point		N/	′ A			
Air Quality	Condition	HQ? @ Exposure Point	N/A N			/A		
(for informational	-	RISK? @ Exposure Point	N	/A	N	/A		
purpose only)	Target Air	@ HQ=1.0	N	/A .	N	/A		
- - - * / • • • • • • • • • • • • • • • • • •	CUL? ug/m ³	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A		
	Target Soil	@ HQ=1.0	N	/A	N	/A		
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A		

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- · Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:	ſ	Bis(2-ethylhe	exyl)phthalat
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF , ABS_d , GI :	- 2 -3 [Jaa
2. Toxicological Properties of the Chemical: Chemical-Specific	۷		
Oral Reference Dose:	RfD_{a}	2.00E-02	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF a	1.40E-02	kg-day/mg
Inhalation Reference Dose:	RfD_{i}		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF _i		kg-day/mg
3. Exposure Parameters			
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	<i>INH</i>	1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS,	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm²-day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI [unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific	_		
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K oc	1.100E+05]l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H_{cc}	4.200E-06	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m ³ /mol", enter value here: *Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H	0.00000.00	atım.m³/mol
The contract of the contract o	H_{cc}	0.000E+00	unitless —

5. Target Ground Water Cleanup Level Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:	
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:	
*Results from the Ground Water Cleanup Level Worksheet are not automatically transferred into this worksheet. C_w 2.20E+00 $^{ m ug/l}$	
6. Site-Specific Hydrogeological Characteristics	
Total Soil Porosity (default = "0.43"):	less
Volumetric Water Content (default = "0.30"): Θ_{w} 0.3 unitless	less
Volumetric Air Content (default = "0.13"): Θ_{α} unitless	less
Dry Soil Bulk Density (default = "1.50"): ρ_b 1.5 kg/l	
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here $f_{oc} = 0.00256$ unitless	less
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific) DF 20 unitless	less
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms	
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the	
air concentration at the exposure point (e.g., within the building)	
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway VAF unitless	less

Chemical of Concern: Bis(2-ethylhexyl)phthalate

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units			
Most stringent soil concentration based on Soil Direct					
Contact & Ground Water Protection:	1.240E+01	mg/kg			
Natural Background concentration for Soil:	N/A	mg/kg			
Practical Quantitation Limit for Soil:	N/A	mg/kg			
Soil Cleanup Level (not considering vapor pathway):	1.240E+01	mg/kg			
Warning! Soil Cleanup Level above may not be protective of vapor exposure pathway - evaluate vapor pathway further.					
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg			

C_{sat} corresponds to the total soil chemical concentration saturated in soil.

 Image: Control of the control of the

R is the ratio of the ground water flow velocity to the

Soil Saturation Limit, C _{sat} :	9.581E+01	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	983.3	unitless	contaminant migration velocity in saturated zone.

Summary by Exposure Pathway						
		j oj zapodale i uti	Method B Method Unrestricted Land Use Industrial La			
Soil Direct			Ingestion only	Ingestion &	Ingestion only	Ingestion &
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A
	Target Soil CUL? mg/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	1.600E+03 7.143E+01	N/A N/A	7.000E+04 9.375E+03	N/A N/A
		10200.1020	<u>Method B</u> <u>Method C</u> @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RISK =1.0			od C
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	N/A			
Potable	Condition	HQ? @ Exposure Point		N/A		/A
Ground Water	Target Ground Water	RISK? @ Exposure Point	N/A N/A 2.200E+00		/A	
	Target Soil CUL?		1.240E+01			
			<u>Method B</u> <u>Method C</u> @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RISK =1.0E			
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point	N/A			
Air Quality	Condition	ndition HQ? @ Exposure Point		N/A		/A
(for informational		RISK? @ Exposure Point		/A	 	/A
purpose only)	Target Air	@ HQ=1.0		/A		<u>/A</u>
	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5		/A	 	/A
	Target Soil	@ HQ=1.0		/A		/A
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- · Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:		Butyl benzyl	phthalate
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF, ABS d, GI:	~ ·		
2. Toxicological Properties of the Chemical: Chemical-Specific	ت		
Oral Reference Dose:	RfD_o	2.00E-01	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF _o		kg-day/mg
Inhalation Reference Dose:	RfD_{i}	2.00E-01	mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF ₁		kg-day/mg
3. Exposure Parameters	-		
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH	1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS_{i}	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	ABI .	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm ² -day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific			_
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K oc	1.400E+04	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	$H_{cc} \blacktriangle$	5.200E-05	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m ³ /mol", enter value here: *Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H H cc	0.000E+00	atım.m³/mol unitless
La constant and the state of the constant of t	cc •	0.0000	

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	2.700E+00	mg/i
5. Target Ground Water Cleanup Level			_
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation: *Results from the Ground Water Cleanup Level Worksheet are	C,,,	1.90E+03	ug/l
not automatically transferred into this worksheet.	שו 🍑	1.702.103	Juga
6. Site-Specific Hydrogeological Characteristics			
Total Soil Porosity (default = "0.43"):	11	0.43	unitless
Volumetric Water Content (default = "0.30"):	$\boldsymbol{\Theta}_{\scriptscriptstyle 1 p}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	$\boldsymbol{\Theta}_{\boldsymbol{\alpha}}$	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms			_
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)			
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern: Butyl benzyl phthalate

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Conc	Units
1.370E+03	mg/kg
N/A	mg/kg
N/A	mg/kg
1.370E+03	mg/kg
otective of vap	or exposure
0.000E+00	mg/kg
	1.370E+03 N/A N/A 1.370E+03 otective of vap y further.

Warning: Soil Cleanup Level is higher than Soil Saturation

Limit

 ${\it C}_{\it sat}$ corresponds to the total soil chemical concentration saturated in soil.

R is the ratio of the ground water flow velocity to the

Soil Saturation Limit, C_{sat} :	9.731E+01	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	126.0	unitless	contaminant migration velocity in saturated zone.

. Summary of Calcu		y by Exposure Path				•
		J V X	<u>Meth</u> Unrestricte	nod <u>B</u> d Land Use RISK =1.0E-6		
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A
	Target Soil CUL? mg/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	1.600E+04 N/A	N/A N/A	7.000E+05 N/A	N/A N/A
			<u>Meth</u> @ HQ=1.0; R	od B	<u>Meth</u> @ HQ=1.0; R	od C
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	N/A			
Potable Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A		N/A .	
Giouna water	Target Ground Water	er CUL? ug/l	N/A N/A 1.900E+03		/A	
	Target Soil CUL?	mg/kg	<u> </u>		E+03	
			<u>Metla</u> @ HQ=1.0; R	<u>rod B</u> ISK =1.0E-6	<u>Meth</u> @ HQ=1.0; R	<u>od C</u> ISK =1.0E-5
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point	N/A			
Air Quality	Condition	HQ? @ Exposure Point	N/A		N	/A
(for informational		RISK? @ Exposure Point	N	/A	N	/A
purpose only)	Target Air	@ HQ=1.0	3.200	E+02	7.000	E+02
	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A
	Target Soil	@ HQ=1.0	0.000)E+00	0.000	E+00
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- · Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:	[c	Chrysene	
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF , ABS_d , GI :	IJ.		
2. Toxicological Properties of the Chemical: Chemical-Specific			•
Oral Reference Dose:	RfD_o		mg/kg-day
Oral Carcinogenic Potency Factor:	CPF _o	7.30E+00	kg-day/mg
Inhalation Reference Dose:	RfD_i		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF _i		kg-day/mg
3. Exposure Parameters	_		-
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH	1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS,	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF [0.2	mg/cm²-day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI [unitless
4. Physical and Chemical Properties of the Chemical; Chemical-Specific	_		
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K oc	4.000E+05	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H _{cc}	3.900E-03	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m3/mol", enter value here:	H		atın.m³/mol
*Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H_{cc}	0.000E+00	unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	1.600E-03	mg/I
5. Target Ground Water Cleanup Level	•		
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation: *Results from the Ground Water Cleanup Level Worksheet are not automatically transferred into this worksheet.	C 10	1.80E-02	ug/l
6. Site-Specific Hydrogeological Characteristics			
Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	$\boldsymbol{\Theta}_{m}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	Θ_{α}	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b^-	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms			••••••
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)			
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern:

Chrysene

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Conc	Units					
·						
3.687E-01	mg/kg					
N/A	mg/kg					
N/A	mg/kg					
3.687E-01	mg/kg					
Warning! Soil Cleanup Level above may not be protective of vapor exposure pathway - evaluate vapor pathway further.						
0.000E+00	mg/kg					
	3.687E-01 N/A N/A 3.687E-01 otective of vap					

 ${\it C}_{\it sat}$ corresponds to the total soil chemical concentration saturated in soil.

R is the ratio of the ground water flow velocity to the

Soil Saturation Limit, C_{sat} :	1.639E+00	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	3,573.1	unitless	contaminant migration velocity in saturated zone.

Summary by Exposure Pathway							
		j zy zaposute i ath	Method B Unrestricted Land Use @ HQ=1.0; RISK =1.0E-6		<u>Method C</u> Industrial Land Use @ HQ=1.0; RISK =1.0E-5		
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal	
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A	
	Target Soil CUL? mg/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	N/A 1.370E-01	N/A N/A	N/A 1.798E+01	N/A N/A	
			<u>Meth</u> @ HQ=1.0; R	od B	<u>Meth</u> @ HQ=1.0; R	od C	
Protection of	Under the Current	Predicted Ground Water Conc? ug/l		. N	A		
Potable Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A		N/A N/A		
Ground Water	Target Ground Water CUL? ug/l Target Soil CUL? mg/kg		1.800E-02 3.687E-01				
	Tanger oon COD.	тук	Method B Method B @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RI				
Protection of	Predicted Air Conc? ug/m³ Under the Current @Exposure Point		N/A				
Air Quality	Condition	HQ? @ Exposure Point	N/A		N/A		
(for informational	Target Air	RISK? @ Exposure Point @ HQ=1.0	N/A N/A		N/A N/A		
purpose only)	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5		/A	 	/A .	
	Target Soil	@ HQ=1.0	ļ	N/A		/A	
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A	

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:	. 1	Dibenzo(a,h)	anthracene
Measured Soil Concentration, if any:	C_s		ing/kg
Natural Background Concentration for Soil:	NB,		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF , ABS_d , GI :	✓ 2 3	·	
2. Toxicological Properties of the Chemical: Chemical-Specific	٧		
Oral Reference Dose:	RfD_{a}		mg/kg-day
Oral Carcinogenic Potency Factor:	CPF_{a}	7.30E+00	kg-day/mg
Inhalation Reference Dose:	RfD_i		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF_i		kg-day/mg
3. Exposure Parameters			
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH	1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS_{I}	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm ² -day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific		-	
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	. Koc	1.800E+06	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H_{cc}	6.000E-07	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m3/mol", enter value here:	H		atm.m³/mol
*Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H_{cc}	0.000E+00	unitless —

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	2.500E-03	mg/l
5. Target Ground Water Cleanup Level			
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:	_		
*Results from the Ground Water Cleanup Level Worksheet are	\boldsymbol{C}_{w}	1.80E-02	ug/l
not automatically transferred into this worksheet.			J
6. Site-Specific Hydrogeological Characteristics			
Total Soil Porosity (default = "0.43"):	It	0.43	unitless
Volumetric Water Content (default = "0.30"):	$\boldsymbol{\Theta}_{\boldsymbol{w}}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	Θ_{α}	0.13	_ unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms			-
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)			_
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern: Dibenzo(a,h)anthracene

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units			
Most stringent soil concentration based on Soil Direct					
Contact & Ground Water Protection:	1.659E+00	mg/kg			
Natural Background concentration for Soil:	N/A	mg/kg			
Practical Quantitation Limit for Soil:	N/A	mg/kg			
Soil Cleanup Level (not considering vapor pathway):	1.659E+00	mg/kg			
Warning! Soil Cleanup Level above may not be protective of vapor exposure pathway - evaluate vapor pathway further.					
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg			

 ${\it C}_{\it sat}$ corresponds to the total soil chemical concentration saturated in soil.

R is the ratio of the ground water flow velocity to the

Soil Saturation Limit, C_{sat} :	1.152E+01	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	16,075.4	unitless	contaminant migration velocity in saturated zone.

Summary by Exposure Pathway							
		j oj zapodate i den	Method B Unrestricted Land Use @ HQ=1.0; RISK =1.0E-6		Method C Industrial Land Use @ HQ=1.0; RISK =1.0E-5		
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal	
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A	
	Target Soil CUL? mg/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	N/A 1.370E-01	N/A N/A	N/A 1.798E+01	N/A N/A	
		1020011023	<u>Meth</u> @ HQ=1.0; RI	od B	<u>Meth</u> @ HQ=1.0; R	od C	
Protection of	Under the Current	Predicted Ground Water Conc? ug/l			/A		
Potable Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A		N/A N/A		
Ground Water	Target Ground Water CUL? ug/l Target Soil CUL? mg/kg		1.800E-02 1.659E+00				
	Tanger con. CCD.		<u>Meth</u> @ HQ=1.0; RI	od B	<u>Meth</u> @ HQ=1.0; R		
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point				•	
Air Quality	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A N/A		N/A N/A		
(for informational purpose only)	Target Air	@ HQ=1.0			N/A		
	CUL? ug/m³ Target Soil	@ RISK=1.0E-6 or 1.0E-5 @ HQ=1.0	N/		N/		
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N/	/A	N.	'A	

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			•
Name of Chemical:	Ţ.	di-butylphth	alate
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB,		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF, ABS d, GI:	~ · . ☑		
2. Toxicological Properties of the Chemical: Chemical-Specific	ىي		
Oral Reference Dose:	RfD_{a}	1.00E-01	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF a		kg-day/mg
Inhalation Reference Dose:	RfD_i		ing/kg-day
Inhalation Carcinogenic Potency Factor:	CPF_i		kg-day/mg
3. Exposure Parameters	•		
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	<i>INH</i> [1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS;	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm ² -day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI "		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific	•		_
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K_{oc}	1.600E+03	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	$H_{cc} \blacktriangle$	3.900E-08	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m ³ /nnol", enter value here: *Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	$H \atop H_{cc}$	0.000E+00	atm.m³/mol unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	1.100E+01]mg/l
5. Target Ground Water Cleanup Level			_
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:	_		
*Results from the Ground Water Cleanup Level Worksheet are	$C_{1\nu}$	4.50E+03	ug/l
not automatically transferred into this worksheet.			
6. Site-Specific Hydrogeological Characteristics			
Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	$\boldsymbol{\varTheta}$,,	0.3	unitless
Volumetric Air Content (default = "0.13"):	Θ_{α}	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for $f_{\sigma c}$ value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms			_
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)	ı		
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern:

di-butylphthalate

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here: V

Basis for Soil Concentration	Conc	Units
Most stringent soil concentration based on Soil Direct		
Contact & Ground Water Protection:	3.866E+02	mg/kg
Natural Background concentration for Soil:	N/A	mg/kg
Practical Quantitation Limit for Soil:	N/A	mg/kg
Soil Cleanup Level (not considering vapor pathway):	3.866E+02	mg/kg
Warning! Soil Cleanup Level above may not be pr pathway - evaluate vapor pathwa	-	or exposure
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg

Warning: Soil Cleanup Level is higher than Soil Saturation Limit!

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C_{sat} corresponds to the total soil chemical concentration saturated in soil.

Soil Saturation Limit, C_{sat} :	4.726E+01	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	15.3	unitless	contaminant migration velocity in saturated zone.

		y by Exposure Path			·	 	
			Method B Method B Unrestricted Land Use Industrial			<u>hod C</u> l Land Use RISK =1.0E-5	
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal	
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A	
	Target Soil CUL? mg/kg	@HQ=1.0	8.000E+03	N/A	3.500E+05	N/A	
	COD! HIB/Kg	@RISK = 1.0E-6 or 1.0E-5	N/A <u>Meth</u> @ HQ=1.0; R	N/A n <u>od B</u> ISK =1.0E-6	N/A <u>Meth</u> @ HQ=1.0; R		
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	N/A				
Potable Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A		N/A		
Ground water	Target Ground Wate		N/A N/A 4.500E+03			/A.	
	Target Soil CUL?	mg/kg		3.866	E+02		
			<u>Method B</u> <u>Method C</u> @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RISK =1				
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point	N/A				
Air Quality	Condition	HQ? @ Exposure Point	N/A		N	/A	
(for informational		RISK? @ Exposure Point	N	/A	N.	/A	
purpose only)	Target Air	@ HQ=1.0	N	/A	N	/A	
	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A	
	Target Soil	@ HQ=1.0	N	/A	N.	/A	
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A	N.	/A	

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- · Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:	1	luoranthene	
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg .
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF, ABS d, GI:	~ · [_ ~ ~
2. Toxicological Properties of the Chemical: Chemical-Specific	ت ت		
Oral Reference Dose:	RfD_{σ}	4.00E-02	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF o		kg-day/mg
Inhalation Reference Dose:	RfD_i		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF_{i}		kg-day/mg
3. Exposure Parameters			
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	<i>INH</i>	1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS,	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm ² -day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	$GI^{"}$		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific	-		_
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K oc	4.900E+04	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H_{cc}	6.600E-04	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m3/mol", enter value here:	H		atm.m³/mol
*Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H_{cc}	0.000E+00	unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	2.100E-01	mg/l
5. Target Ground Water Cleanup Level			•
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation: *Results from the Ground Water Cleanup Level Worksheet are not automatically transferred into this worksheet.	C w	1.40E+02	ug/l
6. Site-Specific Hydrogeological Characteristics			
Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	$oldsymbol{arTheta}_{_{19}}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	$\boldsymbol{\Theta}_{\boldsymbol{\alpha}}$	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_{b}	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for $f_{\it oc}$ value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms	·		-
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)	ı		-
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF	•	unitless

Chemical of Concern:

fluoranthene

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units		
Most stringent soil concentration based on Soil Direct				
Contact & Ground Water Protection:	3.518E+02	mg/kg		
Natural Background concentration for Soil:	N/A	mg/kg		
Practical Quantitation Limit for Soil:	N/A	mg/kg		
Soil Cleanup Level (not considering vapor pathway):	3.518E+02	mg/kg		
Warning! Soil Cleanup Level above may not be protective of vapor exposure pathway - evaluate vapor pathway further.				
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg		

Warning: Soil Cleanup Level is higher than Soil Saturation

Ø

Limit!

 $C_{\it sat}$ corresponds to the total soil chemical concentration saturated in soil.

Soil Saturation Limit, C_{sat} :	2.638E+01	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	438.6	unitless	contaminant migration velocity in saturated zone.

	Summary by Exposure Pathway						
		, i	Method B Unrestricted Land Use @ HQ=1.0; RISK =1.0E-6 Industrial La				
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal	
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A	
	Target Soil CUL? mg/kg	@HQ=1.0	3.200E+03	N/A	1.400E+05	N/A	
	COL! Illg/kg	@RISK =1.0E-6 or 1.0E-5	N/A <u>Metli</u> @ HQ=1.0; R	N/A nod B ISK =1.0E-6	N/A <u>Meth</u> @ HQ=1.0; R		
Protection of	Under the Current	Predicted Ground Water Conc? ug/I	N/A			:	
Potable	Condition	HQ? @ Exposure Point	N/A		N/A		
Ground Water		RISK? @ Exposure Point	N/A		N/A		
	Target Ground Water Target Soil CUL?			3.518	E+02 E+02		
			<u>Method B</u> <u>Method C</u> @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RISK =				
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point	N/A				
Air Quality	Condition	HQ? @ Exposure Point	N/A		N.	/A	
(for informational		RISK? @ Exposure Point	N	/A	N	/A	
purpose only)	Target Air	@ HQ=1.0		/A	N.	/A	
	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A	
	Target Soil	@ HQ=1.0		/A	N		
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A	

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- · Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:	Ī	indeno(1,2,3	-cd)pyrene
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF, ABS d, GI:		· · · · · · · · · · · · · · · · · · ·	Jee
2. Toxicological Properties of the Chemical: Chemical-Specific	ت		
Oral Reference Dose:	RfD_{o}	· ·	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF _a	7.30E+00	kg-day/mg
Inhalation Reference Dose:	RfD_{i}		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF _i		kg-day/mg
3. Exposure Parameters			
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	<i>INH</i> [1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS;	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm ² -day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d	• • • • • • • • • • • • • • • • • • • •	unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific			
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for $f_{\sigma c}$ value	K _{oc}	3.500E+06	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H_{cc}	6.600E-05	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m3/mol", enter value here: *Converted unitless form of H	H	0.000 71.00	atm.m³/mol
*Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H_{cc}	0.000E+00	unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	2.200E-05	mg/l
5. Target Ground Water Cleanup Level			-
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:		4 007 00] .
*Results from the Ground Water Cleanup Level Worksheet are	C_{w}	1.80E-02	ug/l
not automatically transferred into this worksheet.			J
6. Site-Specific Hydrogeological Characteristics			
Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	$\boldsymbol{\varTheta}_{\boldsymbol{w}}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	$\boldsymbol{\Theta}_{\boldsymbol{\alpha}}$	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms			-
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)			
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern: indeno(1,2,3-cd)pyrene

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units
Most stringent soil concentration based on Soil Direct		
Contact & Ground Water Protection:	3.226E+00	mg/kg
Natural Background concentration for Soil:	N/A	mg/kg
Practical Quantitation Limit for Soil:	N/A	mg/kg
Soil Cleanup Level (not considering vapor pathway):	3.226E+00	mg/kg
Warning! Soil Cleanup Level above may not be properly pathway - evaluate vapor pathway		or exposure
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg

Warning: Soil Cleanup Level is higher than Soil Saturation

Limit!

C _{sat} corresponds to the total soil chemical concentration saturated in soil.

Soil Saturation Limit, C _{sat} :	1.971E-01	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	31,256.8	unitless	contaminant migration velocity in saturated zone.

	Summary by Exposure Pathway						
			Meth Unrestricte	nod <u>B</u> d Land Use RISK =1.0E-6	<u>Meth</u> Industrial @ HQ=1.0; R	Land Use	
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal	
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A	
	Target Soil CUL? mg/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	N/A 1.370E-01	N/A N/A	N/A 1.798E+01	N/A N/A	
		10-3-3-3	<u>Meth</u> @ HQ=1.0; R	od B	<u>Meth</u> @ HQ=1.0; R	od C	
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	N		N/A		
Potable Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A		N/A		
Ground water	Target Ground Water CUL? ug/l		N/A N/A 1.800E-02				
	Target Soil CUL?	mg/kg		3.226	E+00	· - · · · · · · · · · · · · · · · · · ·	
			<u>Meth</u> @ HQ=1.0; R	od <u>B</u> ISK =1.0E-6	<u>Meth</u> @ HQ=1.0; R		
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point		. N	'A .		
Air Quality	Condition	HQ? @ Exposure Point	N	/A	N _i	/A	
(for informational		RISK? @ Exposure Point	N	/A	N/	/A	
purpose only)	Target Air	@ HQ=1.0	N	/A	N	/A	
	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5	N	/A	N	/A	
	Target Soil	@ HQ=1.0	N	/A	N.	/A	
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A	N.	/A	

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- · Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:	ត្រ	pentachloro	phenol
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s	······································	mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF, ABS d, GI:	~ · [0 0
2. Toxicological Properties of the Chemical: Chemical-Specific	ب		
Oral Reference Dose:	RfD_{a}	3.00E-02	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF a	1.20E-01	kg-day/mg
Inhalation Reference Dose:	RfD_i		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF_{i}		kg-day/mg
3. Exposure Parameters	·		
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	<i>INH</i>	1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS;	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm²-day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI "		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific	-		
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K oc	5.900E+02	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H_{cc}	1.000E-06	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m3/mol", enter value here:	H		atın.ın³/mol
*Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H_{cc}	0.000E+00	unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	2.000E+03	_mg/l
5. Target Ground Water Cleanup Level			_
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:	C	7 00E 100]
*Results from the Ground Water Cleanup Level Worksheet are	C_{w}	7.90E+00	ug/l
not automatically transferred into this worksheet.			7
6. Site-Specific Hydrogeological Characteristics			_
Total Soil Porosity (default = "0.43"):	11	0.43	unitless
Volumetric Water Content (default = "0.30"):	$\boldsymbol{\varTheta}_{_{\mathbf{1V}}}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	Θ_{α}	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms			
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)	,		_
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern: pentachlorophenol

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units
Most stringent soil concentration based on Soil Direct		
Contact & Ground Water Protection:	2.702E-01	mg/kg
Natural Background concentration for Soil:	N/A	mg/kg
Practical Quantitation Limit for Soil:	N/A	mg/kg
Soil Cleanup Level (not considering vapor pathway):	2.702E-01	mg/kg
Warning! Soil Cleanup Level above may not be propathway - evaluate vapor pathway	-	or exposure
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg

 $C_{\it sat}$ corresponds to the total soil chemical concentration saturated in soil.

Soil Saturation Limit, C_{sat} :	3.421E+03	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	6.3	unitless	contaminant migration velocity in saturated zone.

Summary by Exposure Pathway						
	18mmud T	y by Exposure Path				
				<u>10d B</u> d Land Use	<u>Meth</u> Industrial	
			@ HQ=1.0;	RISK =1.0E-6	@ HQ=1.0; R	ISK =1.0E-5
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal
Contact	Under the Current	HQ? @ Exposure Point	N/A	N/A	N/A	N/A
	Condition	RISK? @ Exposure Point	N/A	N/A	N/A	N/A
	Target Soil	@HQ=1.0	2.400E+03	N/A	1.050E+05	N/A
	CUL? mg/kg	@RISK =1.0E-6 or 1.0E-5	8.333E+00	N/A	1.094E+03	N/A
			<u>Meth</u> @ HQ=1.0; RI		<u>Meth</u> @ HQ=1.0; R	
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	9.12(1.13, 1.1	N/	<u> </u>	1.015-3
Potable	Condition	HQ? @ Exposure Point	N.	/A	N/	'A
Ground Water		RISK? @ Exposure Point	N	/A	N/	'A
	Target Ground Wate	er CUL? ug/l	7.900E+00			
	Target Soil CUL?	mg/kg	2.702E-01			
			Meth	od B	<u>Meth</u>	od C
		T	@ HQ=1.0; RI	ISK =1.0E-6	@ HQ=1.0; R	ISK =1.0E-5
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point		. N	/A	
Air Quality	Condition	HQ? @ Exposure Point	N/	/A	N/	'A
(for informational		RISK? @ Exposure Point	N/	/A	N/	Ά
purpose only)	Target Air	@ HQ=1.0	N/	/A	N/	'A
A 4	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5	N/	/A	N/	'A
	Target Soil	@ HQ=1.0	N/	/A	N/	'A
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N/	/A	N/	'A

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:	Tr.	henol	
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF , ABS_d , GI :	_ ·		
2. Toxicological Properties of the Chemical: Chemical-Specific	ت		
Oral Reference Dose:	RfD_o	6.00E-01	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF _o	•	kg-day/mg
Inhalation Reference Dose:	RfD_{i}		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF,	······································	kg-day/mg
3. Exposure Parameters			
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH [2.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS;	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm²-day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific	_		
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for $f_{\it oc}$ value	K _{oc}	2.900E+01	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	$H_{cc} \blacktriangle$	1.600E-05	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m3/mol", enter value here:	H		atm.m³/mol
*Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H_{cc}	0.000E+00	unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	8.300E+04	mg/i
5. Target Ground Water Cleanup Level	•		
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:	1		7
*Results from the Ground Water Cleanup Level Worksheet are	$C_{1\nu}$	1.70E+06	ug/i
not automatically transferred into this worksheet.			_]
6. Site-Specific Hydrogeological Characteristics			
Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	$\boldsymbol{\varTheta}_{w}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	$\boldsymbol{\Theta}_{\boldsymbol{\alpha}}$	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms	'		_
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)			
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern:

phenol

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units
Most stringent soil concentration based on Soil Direct		·
Contact & Ground Water Protection:	9.324E+03	mg/kg
Natural Background concentration for Soil:	N/A	mg/kg
Practical Quantitation Limit for Soil:	N/A	mg/kg
Soil Cleanup Level (not considering vapor pathway):	9.324E+03	mg/kg
Warning! Soil Cleanup Level above may not be propathway - evaluate vapor pathway		or exposure
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg

 $[\]mathbf{C}_{\mathit{sat}}$ corresponds to the total soil chemical concentration saturated in soil.

Soil Saturation Limit, C_{sat} :	2.276E+04	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	1.3	unitless	contaminant migration velocity in saturated zone.

. Summary of Calcu	Summary by Exposure Pathway							
			Method B Unrestricted Land Use @ HQ=1.0; RISK =1.0E-6		<u>Method C</u> Industrial Land Use @ HQ=1.0; RISK =1.0E-5			
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal		
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A		
	Target Soil CUL? mg/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	4.800E+04 N/A	N/A N/A	2.100E+06 N/A	N/A N/A		
			<u>Method B</u> <u>Method</u> @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RI			od C		
Protection of	Under the Current	Predicted Ground Water Conc? ug/l		N	I/A			
Potable Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A		N/A N/A			
Ground Water	Target Ground Water	<u> </u>	2.11	1.700		E+06		
			9.324E+03 <u>Method B</u> <u>Method C</u> @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RISK =					
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point	1 ³ N/A					
Air Quality	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A			/A /A		
(for informational purpose only)	Target Air	@ HQ=1.0		/A /A		/A /A		
	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5		/A /A		/A /A		
	Target Soil CUL? mg/kg	@ HQ=1.0 @ RISK=1.0E-6 or 1.0E-5		/A /A		/A /A .		

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- · Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information			
Name of Chemical:	Ī,	yrene	
Measured Soil Concentration, if any:	C_s	\ <u>-</u>	mg/kg
Natural Background Concentration for Soil:	NB's		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF, ABS d, GI:	- 2 -, [Jae
2. Toxicological Properties of the Chemical: Chemical-Specific	٣		
Oral Reference Dose:	RfD_{a}	3.00E-02	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF o		kg-day/mg
Inhalation Reference Dose:	RfD_{i}		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF_i		kg-day/mg
3. Exposure Parameters			_
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH	1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS_i	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	· AF	0.2	mg/cm ² -day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI [unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific			_
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K oc	6.800E+04	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H _{cc} ♠	4.500E-04	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m3/mol", enter value here:	$H \mid \lfloor$		atın.m³/mol
*Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H_{cc}	0.000E+00	unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	1.400E-01	mg/l
5. Target Ground Water Cleanup Level			-
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:	_		7
*Results from the Ground Water Cleanup Level Worksheet are	C_w	4.00E+03	ug/l
not automatically transferred into this worksheet.		·	
6. Site-Specific Hydrogeological Characteristics			
Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	$oldsymbol{arTheta}$,,,	0.3	unitless
Volumetric Air Content (default = "0.13"):	Θ_{α}	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b^{-}	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms			_
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)			
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern:

pyrene

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units
Most stringent soil concentration based on Soil Direct		
Contact & Ground Water Protection:	1.394E+04	mg/kg
Natural Background concentration for Soil:	N/A	mg/kg
Practical Quantitation Limit for Soil:	N/A	mg/kg
Soil Cleanup Level (not considering vapor pathway):	1.394E+04	mg/kg
Warning! Soil Cleanup Level above may not be propathway - evaluate vapor pathway		or exposure
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg

Varning: Soil Cleanup Level is higher than Soil Saturation

V

Limit!

V

C_{sat} corresponds to the total soil chemical concentration saturated in soil.

Soil Saturation Limit, C _{sat} :	2.440E+01	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	608.3	unitless	contaminant migration velocity in saturated zone.

Summary by Exposure Pathway							
			Method B Unrestricted Land Use @ HQ=1.0; RISK =1.0E-6		<u>Method C</u> Industrial Land Use @ HQ=1.0; RISK =1.0E-5		
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal	
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A	
	Target Soil	@HQ=1.0	2.400E+03	N/A N/A	1.050E+05 N/A	N/A	
	CUL? mg/kg	@RISK =1.0E-6 or 1.0E-5	N/A <u>Meth</u> @ HQ=1.0; R	N/A od C			
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	@11Q-1.0, K		@ HQ=1.0; RISK =1.0E-5 /A N/A		
Potable Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point		/A			
Ground water	Target Ground Water	er CUL? 'ug/l	N/A 4.000				
	Target Soil CUL?	mg/kg		1.394	E+04		
			<u>Meth</u> @ HQ=1.0; R		<u>Meth</u> @ HQ=1.0; R		
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point		N	/A		
Air Quality	Condition	HQ? @ Exposure Point	N/A N/A		N/	Ά	
(for informational		RISK? @ Exposure Point			N/	Ά	
purpose only)	Target Air	@ HQ=1.0	N	/A	N/	'A	
A A	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5	N	/A	N/	'A	
	Target Soil	@ HQ=1.0	N	/A	N/	'A	
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A	N/	'A	

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- · Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information		<u> </u>	***************************************
Name of Chemical:	[5	elenium	
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s		ing/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF, ABS d, GI:	~ · [7 0 0
2. Toxicological Properties of the Chemical: Chemical-Specific	ت		
Oral Reference Dose:	RfD_{a}	5.00E-03	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF o	-	kg-day/mg
Inhalation Reference Dose:	RfD_i		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF _i		kg-day/mg
3. Exposure Parameters		***************************************	
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	<i>INH</i>	1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS_i	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	ı	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm²-day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d		unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	$GI^{"}$		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific	_		
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for $f_{\sigma c}$ value	K oc	5.000E+00	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H _{cc.} ♠	0.000E+00	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m ³ /nol", enter value here:	H		atm.m³/mol
*Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H_{cc}	0.000E+00	unitless

Solubility of the Chemical in water: for the calculation of soil saturation limit	Ŋ		_հա հ ո
5. Target Ground Water Cleanup Level			
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:			•
*Results from the Ground Water Cleanup Level Worksheet are	C_{w}	7.10E+01	ug/i
not automatically transferred into this worksheet.	Į.		
6. Site-Specific Hydrogeological Characteristics			_
Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	$\boldsymbol{\varTheta}_{\boldsymbol{\mathfrak{1P}}}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	Θ_{α}	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	1	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms			
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)	ı		_
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF	•	unitless

Chemical of Concern:

selenium

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units
Most stringent soil concentration based on Soil Direct		
Contact & Ground Water Protection:	7.384E+00	mg/kg
Natural Background concentration for Soil:	N/A	mg/kg
Practical Quantitation Limit for Soil:	N/A mg	
Soil Cleanup Level (not considering vapor pathway):	7.384E+00	mg/kg
Warning! Soil Cleanup Level above may not be pr pathway - evaluate vapor pathwa	-	or exposure
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg

Warning: Soil Cleanup Level is higher than Soil Saturation

V

Limitl

V

 $oldsymbol{C}_{\it sat}$ corresponds to the total soil chemical concentration saturated in soil.

Soil Saturation Limit, C _{sat} :	0.000E+00	mg/kg	R is the ratio
Retardation Factor, R:	18.4	unitless	contamin

I is the ratio of the ground water flow velocity to the contaminant migration velocity in saturated zone.

Summary by Exposure Pathway							
			Method B Unrestricted Land Use @ HQ=1.0; RISK =1.0E-6		<u>Method C</u> Industrial Land Use @ HQ=1.0; RISK =1.0E-5		
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion &	
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A	
	Target Soil CUL? mg/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	4.000E+02 N/A	N/A N/A	1.750E+04 N/A	N/A N/A	
			<u>Method B</u> <u>Method</u> @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RIS			od C	
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	N/A				
Potable Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A		N/A N/A		
Ground Willer	Target Ground Water			7.100)E+01		
	Timger oon COL?	шукд	7.384E+00 <u>Method B</u>				
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point	N/A				
Air Quality	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A N/A		N/A N/A		
(for informational purpose only)	Target Air	@ HQ=1.0				/A	
	CUL? ug/m³ Target Soil	@ RISK=1.0E-6 or 1.0E-5 @ HQ=1.0		/A /A		/A /A	
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N	/A		/A	

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information		· _ · · · · · · · · · · · · · · · · · ·	
Name of Chemical:	s	ilver	
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB.		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF , ABS_d , GI :	✓ .		7
2. Toxicological Properties of the Chemical: Chemical-Specific	Ľ		
Oral Reference Dose:	RfD_a	5.00E-03	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF _a		kg-day/mg
Inhalation Reference Dose:	RfD_i		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF,	· · · · · · · · · · · · · · · · · · ·	kg-day/mg
3. Exposure Parameters	• •		
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH [1.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS,	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	\overline{AF}	0.2	mg/cm ² -day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d	····	unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific	_		
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K_{oc}	8.300E+00	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H_{cc}	0.000E+00	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m ³ /mol", enter value here: *Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H H _{cc}	0.000E+00	atın.m³/mol unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S		mg/l
5. Target Ground Water Cleanup Level			
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:			
*Results from the Ground Water Cleanup Level Worksheet are	C_{w}	1.90E+00	ug/İ
not automatically transferred into this worksheet.			
6. Site-Specific Hydrogeological Characteristics			
Total Soil Porosity (default = "0.43"):	11	0.43	unitless
Volumetric Water Content (default = "0.30"):	$oldsymbol{arTheta}_{\scriptscriptstyle 1P}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	Θ_{α}	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	1	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms		-	
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the			
air concentration at the exposure point (e.g., within the building)			_
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern:

silver

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units
Most stringent soil concentration based on Soil Direct		
Contact & Ground Water Protection:	3.230E-01	mg/kg
Natural Background concentration for Soil:	N/A	mg/kg
Practical Quantitation Limit for Soil:	N/A	mg/kg
Soil Cleanup Level (not considering vapor pathway):	3.230E-01	mg/kg
Warning! Soil Cleanup Level above may not be pr pathway - evaluate vapor pathwa		or exposure
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg

Warning: Soil Cleanup Level is higher than Soil Saturation

V

Limit!

 $C_{\it sat}$ corresponds to the total soil chemical concentration saturated in soil.

Soil Saturation Limit, C_{sat} :	0.000E+00	mg/kg	R is the ratio of the ground water flow velocity to the
Retardation Factor, R:	30.0	unitless	contaminant migration velocity in saturated zone.

. Summary of Calcu		y by Exposure Path	<u></u>			··
	·		Method B Unrestricted Land Use @ HQ=1.0; RISK =1.0E-6		Method C Industrial Land Use @ HQ=1.0; RISK =1.0E-5	
Soil Direct			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A N/A	N/A N/A	N/A N/A
	Target Soil CUL? mg/kg	@HQ=1.0 @RISK =1.0E-6 or 1.0E-5	4.000E+02 N/A	N/A N/A	1.750E+04 N/A	N/A N/A
		102 0 0 1 102 3	Method B Method C @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RISK =1.0E-6 Method C Method C			
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	N/A			
Potable Ground Water	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A		N/A	
Ground Water	Target Ground Water	er CUL? ug/l	1.900E+00			'A
	Target Soil CUL?	mg/kg	3.230E-01 <u>Method B</u> <u>Method C</u> @ HQ=1.0; RISK =1.0E-6			
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point				
Air Quality	Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A		N/A N/A	
(for informational purpose only)	Target Air	@ HQ=1.0	N/A		N/A	
	CUL? ug/m³ Target Soil	@ RISK=1.0E-6 or 1.0E-5 @ HQ=1.0	N/		N/	
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N/	'A	N/	'A

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- · Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- · Soil residual saturation (see WAC 173-340-747(10));
- · Ecological impacts (see WAC 173-340-7490 through 7494); and
- · Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).

Date:

12/7/2006

Site Name:

Former Rhone-Poulenc Site Northwest Corner

Evaluator:

Z. Satterwhite

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Item	Symbol	Value	Units
1. General information		······································	
Name of Chemical:	[2	,4,5-trichlo	rophenol
Measured Soil Concentration, if any:	C_s		mg/kg
Natural Background Concentration for Soil:	NB_s		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF , ABS_d , GI :	~ · _		76
2. Toxicological Properties of the Chemical: Chemical-Specific	ت		
Oral Reference Dose:	RfD_{a}	1.00E-01	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF _o		kg-day/mg
Inhalation Reference Dose:	RfD_i		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF_i		kg-day/mg
3. Exposure Parameters			
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH [2.00E+00	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS;	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	AB1	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm ² -day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d	•	unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI -		unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific	_		-
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K _{oc}	1.600E+03	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H_{cc}	1.800E-04	unitless
*If the value for Henry's Law Constant is given in the unit of "atm.m3/mol", enter value here:	H		atın.ın³/ınol
*Converted unitless form of H_{cc} @13° C: (Enter this converted value into " H_{cc} input Box" above for a calculation)	H_{cc}	0.000E+00	unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	S	1.200E+03	mg/l
5. Target Ground Water Cleanup Level			
Target Ground Water Cleanup Level applicable for a soil cleanup level calculation:			1
*Results from the Ground Water Cleanup Level Worksheet are	C_w	3.60E+03	ug/l
not automatically transferred into this worksheet.			
6. Site-Specific Hydrogeological Characteristics			
Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	$\boldsymbol{\varTheta}_{w}$	0.3	unitless
Volumetric Air Content (default = "0.13"):	$\boldsymbol{\Theta}_{\boldsymbol{\alpha}}$	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	0.00256	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	DF	20	unitless
7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms			-
* Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the	•		
air concentration at the exposure point (e.g., within the building)			_
Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	VAF		unitless

Chemical of Concern: 2,4,5

2,4,5-trichlorophenol

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here:

To calculate a soil concentration based on Method C vapor pathway, check here:

Basis for Soil Concentration	Conc	Units			
Most stringent soil concentration based on Soil Direct					
Contact & Ground Water Protection:	3.093E+02	mg/kg			
Natural Background concentration for Soil:	N/A	mg/kg			
Practical Quantitation Limit for Soil:	N/A	mg/kg			
Soil Cleanup Level (not considering vapor pathway):	3.093E+02	mg/kg			
Warning! Soil Cleanup Level above may not be protective of vapor exposure pathway - evaluate vapor pathway further.					
Soil concentration based on Vapor Pathway (informational purposes only):	0.000E+00	mg/kg			

 $\mathbf{C}_{\mathit{sat}}$ corresponds to the total soil chemical concentration saturated in soil.

Soil Saturation Limit, C_{sat} :	5.155E+03	mg/kg	R is
Retardation Factor, R:	15.3	unitless	

is the ratio of the ground water flow velocity to the contaminant migration velocity in saturated zone.

Cumman L. E P. //							
Summary by Exposure Pathway							
	·		Method B Unrestricted Land Use @ HQ=1.0; RISK =1.0E-6		Method C Industrial Land Use @ HQ=1.0; RISK =1.0E-5		
Soil Direct		·	Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal	
Contact	Under the Current Condition	HQ? @ Exposure Point RISK? @ Exposure Point	N/A N/A	N/A	N/A	N/A	
	Target Soil	@HQ=1.0		N/A	N/A	N/A	
	CUL? mg/kg	@RISK =1.0E-6 or 1.0E-5	8.000E+03 N/A	N/A	3.500E+05	N/A	
		T@:date 1:00-001 1:0E-3	Method B Method C			od C	
Protection of	Under the Current	Predicted Ground Water Conc? ug/l	@ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RISK =1.0E- N/A				
Potable	Condition	HQ? @ Exposure Point	N/A N/A		N/A		
Ground Water		RISK? @ Exposure Point			N/A		
·	Target Ground Wate	3.600E+03					
	Target Soil CUL?	mg/kg		3.093	E+02		
			Method B Method C @ HQ=1.0; RISK =1.0E-6 @ HQ=1.0; RISK =1.0E				
Protection of	Under the Current	Predicted Air Conc? ug/m³ @Exposure Point	N/A				
Air Quality	Condition	HQ? @ Exposure Point	N/A N/A		N/A		'A
(for informational		RISK? @ Exposure Point	N/A		N/A		
purpose only)	Target Air	@ HQ=1.0	N/	Ά	N/	'A	
	CUL? ug/m³	@ RISK=1.0E-6 or 1.0E-5	N/	'A	N/	'A	
	Target Soil	@ HQ=1.0	N/A N		N/	'A	
	CUL? mg/kg	@ RISK=1.0E-6 or 1.0E-5	N/	'A	N/	'A	

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

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- · Soil residual saturation (see WAC 173-340-747(10));
- Ecological impacts (see WAC 173-340-7490 through 7494); and
- · Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

- · Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- · Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- · Total site risk (see WAC 173-340-750(5)(a)).